AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF PAGES
J	1	2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0004	21 February 2003		

6. ISSUED BY CODE

U.S. ARMY ENGINEER DISTRICT, ALBUQUERQUE
CORPS OF ENGINEERS
4101 JEFFERSON PLAZA, N.E.
ALBUQUERQUE, NEW MEXICO 87109-3435

7. ADMINISTERED BY *(If other than Item 6)* CODE

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*

CODE FACILITY CODE

(√)	
X	9A. AMENDMENT OF SOLICITATION NO. DACW47-02-B-0016
X	9B. DATED *(SEE ITEM 11)* 21 June 2002
	10A. MODIFICATION OF CONTRACTS/ORDER NO.
	10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☒ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√)	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

PROJECT: IMMIGRATION AND NATURALIZATION SERVICE, ALPINE BORDER PATROL STATION, ALPINE, TEXAS

1. This is Amendment No. 4 to Solicitation No. DACW47-02-B-0016; 21 June 2002. The following revisions shall be incorporated into the specifications and drawings. All other provisions shall remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY *(Signature of Contracting Officer)*	16C. DATE SIGNED

2. Receipt of proposals is 07 March 2003, 3:00 p.m (MST). Proposers need to acknowledge all amendments on the SF 1442.

3. SPECIFICATIONS: Delete the following listed pages and substitute the pages attached hereto. On the revised pages, for convenience, changes are emphasized by the amendment number in parentheses before and after changes from the previous issue. All portions of the revised (or new) pages shall apply whether or not changes have been indicated.

Delete Page	Insert Page
00010-3 thru 00010-5	00010-3 thru 00010-7
00800-1 thru 00800-2	00800-1 thru 00080-2a
Table of Contents, Page 2 and 4	Table of Contents, Page 2 and 4
02510-7	02510-7
02510-13 thru 02510-14	02510-13 thru 02510-14
02510-20	02510-20
02540-1 thru 02540-6	(Delete entire section)
--	02812-1 thru 02812-20 (New section)
11143-9	11143-9
11143-13	11143-13
11143-15	11143-15
11211-1 thru 11211-13	(Delete entire section)
11501-1 thru 11501-8	(Delete entire section)
13205-1 thru 13205-10	13205-1 thru 13205-9
13206-1 thru 13206-9	(Delete entire section)
13920-1 thru 13920-22	(Delete entire section)
13930-4	13930-4
13930-11	13930-11

5. DRAWING CHANGES: The following drawings have been revised and the sequence number changed to indicate such revision: 2.4, 3.1, 4.1, 5.1, 6.1, 7.2, 8.2, 9.1, 11.1, 12.1, 13.1, 15.1, 17.1, 18.1, 24.1, 25.1, 26.1, 27.1, 28.1, 30.1, 31.1, 34.1, 57.1, 58.1, 59.1, 60.1, 61.1, 62.1, 63.1, 64.1, 65.1, 66.1, 67.2, 68.1, 69.1, 70.1, 80.2, 81.2, 84.1, 85.1, 86.1, 87.1, 88.2, 89.2, 90.1, 91.1, 92.2, 93.1, 99.1, 100.1, 101.1, 102.1, 104.1, 105.1, 108.1, 109.1, 110.1, 112.1, 119.1, 120.1, 121.1, 123.1, 125.1, 126.1, 127.1, 128.1, 131.1, 142.1, 143.1, 144.1, 145.1, 147.1, 148.1, 149.1, 150.1, 151.1, 152.1, 154.1, 156.1 and 159.1.

////////LAST ITEM////////

Solicitation No. DACW47-02-B-0016

BIDDING SCHEDULE
(To be attached to SF 1442)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
	BASE BID				
(4) 0001	Administration Building Including Sallyport, Complete	Job	Sum	***	$_____
0002	Sitework Including Detention Ponds, Fencing, Hydraulic Gate, Curb and Gutter, Rigid and Flexible Pavement, Signage, Aggregate Base Course Surface, Striping, Canopy, Sidewalks, Impound Vehicle Lot, CMU Wall, Grading, Utilities, Lighting, Electrical Yard with Engine Generator, Bus Dump Station, Landscaping, Storm Drainage System, Trench Drain, Rock Apron, and All Associated Work, Complete	Job	Sum	***	$_____
0003	Operation and Maintenance Manuals	Job	Sum	***	$ 7,000.00
0004	As-Built Drawings	Job	Sum	***	$ 7,000.00
	TOTAL AMOUNT - BASE BID				$_____

BIDDING SCHEDULE (Cont'd)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
OPTION NO. 1					
0005	Maintenance Building Including Dumpster Pad, and Rigid Pavement In Lieu of Aggregate Surface and Flexible Pavement, Complete	Job	Sum	***	$
0006	Operation and Maintenance Manuals	Job	Sum	***	$ 2,000.00
0007	As-Built Drawings	Job	Sum	***	$ 2,000.00
	TOTAL AMOUNT - OPTION NO. 1				$
OPTION NO. 2					
0008	Fuel Island/Car Wash Including Canopy, Oil/Water Separator, and Rigid Pavement In Lieu of Flexible Pavement, Complete	Job	Sum	***	$
0009	Operation and Maintenance Manuals	Job	Sum	***	$ 2,000.00
0010	As-Built Drawings	Job	Sum	***	$ 2,000.00
	TOTAL AMOUNT - OPTION NO. 2				$

BIDDING SCHEDULE (Cont'd)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
OPTION NO. 3					
0011	Kennel Building Including Fencing, Sidewalk, Access Drive and Parking Area, Complete	Job	Sum	***	$
0012	Operation and Maintenance Manuals	Job	Sum	***	$ 2,000.00
0013	As-Built Drawings	Job	Sum	***	$ 2,000.00
	TOTAL AMOUNT - OPTION NO. 3				$
OPTION NO. 4					
0014	Covered Parking Structure, Complete	Job	Sum	***	$
0015	As-Built Drawings	Job	Sum	***	$ 2,000.00
	TOTAL AMOUNT - OPTION NO. 4				$
OPTION NO. 5					
0016	Helipad Including Grading, Rigid and Flexible Pavement, Lighting, Gate, Rotating Beacon, and Wind Cone, Complete	Job	Sum	***	$
0017	As-Built Drawings	Job	Sum	***	$ 2,000.00
	TOTAL AMOUNT - OPTION NO. 5				$

BIDDING SCHEDULE (Cont'd)

RECAPITULATION

1. TOTAL AMOUNT - BASE BID $_____

2. TOTAL AMOUNT - BASE BID AND OPTIONS NO. 1, 2, 3, 4, AND 5 $_____)4)

NOTES:

1. Award of Base Bid and Options (if awarded) will be made to one bidder. Bidders must bid on all items.

2. EXERCISE OF OPTIONS. The Government reserves the right to exercise the option(s) by written notice to the Contractor either singularly or in any (4) combination for up to 90 calendar days after award of the Base Bid without an (4) increase in the Offeror's bid price. Completion of added options shall continue at the same schedule as the Base Bid unless otherwise noted in the SPECIAL CONTRACT REQUIREMENTS, Paragraph 1, COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK.

3. EVALUATION OF OPTIONS: (FAR 52.217-5) (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirements. Evaluation of options will not obligate the Government to exercise the options.

4. ARITHMETIC DISCREPANCIES: (MAR 1995)

(a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the bidding schedule as submitted by bidders:

(1) Obviously misplaced decimal points will be corrected;

(2) Discrepancy between unit price and extended price, the unit price will govern;

(3) Apparent errors in extension of unit prices will be corrected;

(4) Apparent errors in addition of lump sum and extended prices will be corrected.

BIDDING SCHEDULE (Cont'd)

NOTES: (Cont'd)

(b) For the purposes of bid evaluation, the Government will proceed on the assumption that the bidder intends his bid to be evaluated on basis of the unit prices, extensions, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids. (EFARS 52.214-5000)

5. PROGRESS PAYMENT REQUESTS made by the Contractor pursuant to the provisions of Contract Clause, PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS, shall be submitted on ENG FORM 93 to the administration office as designated in Block 26, Standard Form 1442 Back, Solicitation, Offer and Award. ENG FORM 93 shall be submitted to that office on the 1st of each month in appropriate form and certified. Photocopies of the form shall be furnished on that same date to the Corps of Engineers offices designated at the Pre-Construction Conference. (The Corps of Engineers administration office will provide a copy of ENG FORM 93 and Certification (SWA 739-R) to the Contractor at the Pre-Construction Conference.)

Specifications: Immigration And Naturalization Services, 100-Agent Border Patrol Station, Alpine, Texas

SECTION 00800

SPECIAL CONTRACT REQUIREMENTS

1. COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (FAR 52.211-10) (APR 1984).

(a) The Contractor shall be required to (a) commence work under this contract within ten (10) calendar days after the date the Contractor receives notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than the dates or number of calendar days after the date of receipt of notice to proceed set forth in the schedule below except as specified in the various landscaping sections:

SCHEDULE

SPA APR 1993

Item of Work	Commencement Time in Calendar Days After Receipt of Notice to Proceed	Completion Time in Calendar Days After Receipt of Notice to Proceed	Liquidated Damages Per Calendar Day
BASE BID			
(4) (1) Administration Building and Site Work, Complete	10	240	$898.00
(2) As-Built Drawings	Note 1	-	-
(3) Operations and Maintenance Manuals	Note 2	-	-
OPTION NO. 1			
(4) Vehicle Maintenance Building, Complete	10	270	$898.00
(5) As-Built Drawings	Note 1	-	-
(6) Operation and Maintenance Manuals	Note 2	-	-

Item of Work	Commencement Time in Calendar Days After Receipt of Notice to Proceed	Completion Time in Calendar Days After Receipt of Notice to Proceed	Liquidated Damages Per Calendar Day
OPTION NO. 2			
(7) Fuel Island / Car Wash, Complete	No additional time will be provided. The work shall be accomplished within the duration specified for the base bid.		
(8) As-Built Drawings	Note 1	-	-
(9) Operation and Maintenance Manuals	Note 2	-	-
OPTION NO. 3			
(10) Kennel Building, Complete	No additional time will be provided. The work shall be accomplished within the duration specified for the base bid.		
(11) As-Built Drawings	Note 1	-	-
(12) Operation and Maintenance Manuals	Note 2	-	-
OPTION NO. 4			
(13) Covered Parking Structure, Complete	No additional time will be provided. The work shall be accomplished within the duration specified for the base bid.		
(14) As-Built Drawings	Note 1	-	-
OPTION NO. 5			
(15) Helicopter Pad, Complete	No additional time will be provided. The work shall be accomplished within the duration specified for the base bid.		
(16) As-Built Drawings	Note 1	-	-

(4)

NOTES:

1. The Contractor shall commence work on the final as-built drawings upon receipt of the approved preliminary as-built drawings and the reproducible original contract drawings. The Contractor shall have 60 calendar days after such receipt to complete and return to the Contracting Officer all specified final as-built drawing work. Upon satisfactory completion of this work the Contractor shall have earned the amount shown for As-Built Drawings in the Bidding Schedule.

2. O & M Manuals shall be developed and submitted in accordance with Section 01730 - OPERATION AND MAINTENANCE INSTRUCTIONS, at least 60 calendar days prior to the scheduled contract completion date. Upon approval of fully developed O & M Manuals, the Contractor shall have earned the amount shown for "Operations and Maintenance Manuals" in the Pricing Schedule.

(b) The time stated for completion shall include final cleanup of the premises.

(c) In the event the Heating and/or Air Conditioning Systems cannot be tested at or near design temperatures during the above period, beneficial occupancy and use of the facilities may be accepted and final testing and adjustments of the heating and/or air conditioning deferred as specified in the appropriate testing clauses of the Technical Provisions.

2. TIME EXTENSIONS (FAR 52.211-13) (SEP 2000). Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will

SECTION 02316 - EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

SECTION 02378 - GEOTEXTILES USED AS FILTERS (FILTER FABRIC)

SECTION 02510 - WATER DISTRIBUTION SYSTEM

SECTION 02531 - SANITARY SEWERS

(4) DELETED (4)

SECTION 02556 - GAS DISTRIBUTION SYSTEMS

SECTION 02580 – COMMUNICATION TOWER

SECTION 02630 - STORM-DRAINAGE SYSTEMS

SECTION 02722 - AGGREGATE BASE COURSE

SECTION 02735 - PREFABRICATED GRAVITY OIL/WATER SEPARATOR

SECTION 02741 - BITUMINOUS PAVING FOR ROADS, STREETS AND OPEN STORAGE AREAS

SECTION 02748 - BITUMINOUS TACK AND PRIME COATS

SECTION 02754 - CONCRETE PAVEMENTS

SECTION 02760 - FIELD MOLDED SEALANTS FOR SEALING JOINTS IN RIGID PAVEMENTS

SECTION 02762 - COMPRESSION JOINT SEALS FOR CONCRETE PAVEMENTS

SECTION 02763 - PAVEMENT MARKINGS

SECTION 02770 - CONCRETE SIDEWALKS AND CURBS AND GUTTERS

(4) SECTION 02812 – IRRIGATION (SPRINKLER) SYSTEM (4)

SECTION 02821 - FENCING

SECTION 02825 – VERTICAL PIVOT GATE SYSTEM

SECTION 02831 - CHAIN LINK GATES

SECTION 02930 - EXTERIOR PLANTING

DIVISION 3 - CONCRETE

SECTION 03100 - STRUCTURAL CONCRETE FORMWORK

SECTION 03150 - EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS

SECTION 03200 - CONCRETE REINFORCEMENT

SECTION 03300 - CAST-IN-PLACE STRUCTURAL CONCRETE

DIVISION 4 - MASONRY

SECTION 04200 - MASONRY

DIVISION 5 - METALS

SECTION 05090 - WELDING, STRUCTURAL

SECTION 05093 – WELDING PRESSURE PIPING

SECTION 05120 - STRUCTURAL STEEL

SECTION 09900 - PAINTING, GENERAL

DIVISION 10 - SPECIALTIES

SECTION 10100 - MISCELLANEOUS ITEMS

SECTION 10160 - TOILET PARTITIONS

SECTION 10270 - RAISED FLOOR SYSTEM

SECTION 10350 - FLAGPOLE

SECTION 10430 - EXTERIOR SIGNAGE

SECTION 10440 - INTERIOR SIGNAGE

SECTION 10508 - METAL LOCKERS

SECTION 10800 - TOILET ACCESSORIES

DIVISION 11 - EQUIPMENT

SECTION 11143 - ABOVEGROUND FUEL STORAGE TANK SYSTEM

(4) DELETED (4)

SECTION 11392 - CLOSED LOOP VEHICLE WASH WATER RECYCLE SYSTEM

SECTION 11400 - INVENTORY CONTROL SYSTEM

(4) DELETED (4)

DIVISION 12 - FURNISHINGS

SECTION 12490 - WINDOW TREATMENT

DIVISION 13 - SPECIAL CONSTRUCTION

SECTION 13080 - SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT

SECTION 13100 - LIGHTNING PROTECTION SYSTEM

SECTION 13110 - CATHODIC PROTECTION SYSTEM (SACRIFICIAL ANODE)

SECTION 13112 - CATHODIC PROTECTION SYSTEM (IMPRESSED CURRENT)

SECTION 13120 - STANDARD METAL BUILDING SYSTEMS

SECTION 13205 - FLEET MANAGEMENT SYSTEM

(4) DELETED (4)

SECTION 13851 - FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE

(4) DELETED (4)

SECTION 13930 - SPRINKLER SYSTEM, FIRE PROTECTION

SECTION 13970 - BULLET-RESISTANT COMPONENTS

DIVISION 14 - CONVEYING SYSTEMS

NOT USED

A statement signed by the manufacturer's field representative certifying that the Contractor's personnel are capable of properly installing the pipe on the project.

(4)

(4)

1.5 HANDLING

Pipe and accessories shall be handled to ensure delivery to the trench in sound, undamaged condition, including no injury to the pipe coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor in a satisfactory manner, at no additional cost to the Government. No other pipe or material shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

1.5.1 Polyethylene (PE) Pipe Fittings and Accessories

PE pipe, fittings, and accessories shall be handled in conformance with AWWA C901.

1.5.2 Miscellaneous Plastic Pipe and Fittings

Polyvinyl Chloride (PVC), Reinforced Thermosetting Resin Pipe (RTRP), and Reinforced Plastic Mortar Pressure (RPMP) pipe and fittings shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325-1.

PART 2 - PRODUCTS

2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

The minimum thickness of metal shall be 3/16 inch. Concrete boxes shall be the standard product of a manufacturer of precast concrete equipment. The word "WATER" shall be cast in the cover. The box length shall adapt, without full extension, to the depth of cover required over the pipe at the valve location.

(4) 2.6 DELETED

(4)

2.7 FIRE HYDRANTS

Hydrants shall be dry-barrel type conforming to AWWA C502 with valve opening at least 5 inches in diameter and designed so that the flange at the main valve seat can be removed with the main valve seat apparatus remaining intact, closed and reasonably tight against leakage and with a breakable valve rod coupling and breakable flange connections located no more than 8 inches above the ground grade. Hydrants shall have a 6 inch bell connection, two 2-1/2 inch hose connections and one 4-1/2 inch pumper connection. Outlets shall have American National Standard fire-hose coupling threads. Working parts shall be bronze. Design, material, and workmanship shall be equal to the latest stock pattern ordinarily produced by the manufacturer. Hydrants shall be painted with 1 coat of red iron oxide, zinc oxide primer conforming to SSPC Paint 25 and 2 finish coats of silicone alkyd paint conforming to SSPC Paint 21, color in accordance with NFPA recommendations. Suitable bronze adapter for each outlet, with caps, shall be furnished.

2.8 MISCELLANEOUS ITEMS

2.8.1 Service Clamps

Service clamps shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable-iron body with cadmium plated straps and nuts. Clamps shall have a rubber gasket cemented to the body.

2.8.2 Corporation Stops

Corporation stops shall have standard corporation stop thread conforming to AWWA C800 on the inlet end, with flanged joints, compression pattern flared tube couplings, or wiped joints for connections to goosenecks.

2.8.3 Goosenecks

Copper tubing for gooseneck connections shall conform to the applicable requirements of ASTM B 88, ASTM B 88M, Type K, annealed. Length of cable requirement connections shall be in accordance with standard practice.

2.8.4 Tapping Sleeves

Tapping sleeves of the sizes indicated for connection to existing main shall be the cast gray, ductile, or malleable iron, split-sleeve type with flanged or grooved outlet, and with bolts, follower rings and gaskets on each end of the sleeve. Construction shall be suitable for a maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve. When using grooved mechanical tee, it shall consist of an upper housing with full locating collar for rigid positioning which engages a machine-cut hole in pipe, encasing an elastomeric gasket which conforms to the pipe outside diameter around the hole and a lower housing with positioning lugs, secured together during assembly by nuts and bolts as specified, pretorqued to 50 foot-pound.

2.8.5 Service Boxes

Service boxes shall be cast iron or concrete and shall be extension service boxes of the length required for the depth of the line, with either screw or slide-type adjustment. The boxes shall have housings of sufficient size to completely cover the service stop or valve and shall be complete with identifying covers.

2.8.6 Disinfection

Chlorinating materials shall conform to the following:

Chlorine, Liquid: AWWA B301.

Hypochlorite, Calcium and Sodium: AWWA B300.

(4) 2.8.7 Deleted

2.9 DELETED

(4)

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Cutting of Pipe

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable. Copper

the main diameter and the service line diameter, and shall have a gate valve. Lines 3 inches and larger may use rubber-seated butterfly valves as specified above, or gate valves.

3.1.6.3 Service Lines for Sprinkler Supplies

Water service lines used to supply building sprinkler systems for fire protection shall be connected to the water distribution main in accordance with NFPA 24.

3.1.7 Setting of Fire Hydrants, Meters, Valves and Valve Boxes

3.1.7.1 Location of Fire Hydrants

Fire hydrants shall be located and installed as shown. Each hydrant shall be connected to the main with a 6 inch branch line having at least as much cover as the distribution main. Hydrants shall be set plumb with pumper nozzle facing the roadway, with the center of the lowest outlet not less than 18 inches above the finished surrounding grade, and the operating nut not more than 48 inches above the finished surrounding grade. Except where approved otherwise, the backfill around hydrants shall be thoroughly compacted to the finished grade immediately after installation to obtain beneficial use of the hydrant as soon as practicable. The hydrant shall be set upon a slab of concrete not less than 4 inches thick and 15 inches square. Not less than 7 cubic feet of free-draining broken stone or gravel shall be placed around and beneath the waste opening of dry barrel hydrants to ensure drainage.

(4) 3.1.7.2 Deleted

(4)

3.1.7.3 Location of Valves

After delivery, valves, including those in hydrants, shall be drained to prevent freezing and shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and hydrants and valves shall be fully opened and fully closed to ensure that all parts are in working condition. Valves and valve boxes shall be installed where shown or specified, and shall be set plumb. Valve boxes shall be centered on the valves. Boxes shall be installed over each outside gate valve unless otherwise shown. Where feasible, valves shall be located outside the area of roads and streets. Earth fill shall be tamped around each valve box or pit to a distance of 4 feet on all sides of the box, or the undisturbed trench face if less than 4 feet.

3.1.8 Thrust Restraint

Plugs, caps, tees and bends deflecting 11.25 degrees or more, either vertically or horizontally, on waterlines 4 inches in diameter or larger, and fire hydrants shall be provided with thrust restraints. Valves shall be

SECTION 02812

IRRIGATION (SPRINKLER) SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

This section includes the design, performance and related requirements of the irrigation system. Water distribution and service lines not within the system are specified in Section 02510 WATER DISTRIBUTION SYSTEM.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53	(1989a) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
ASTM B 32	(1989) Solder Metal.
ASTM B 43	(1988) Seamless Red Brass Pipe, Standard Sizes.
ASTM B 88	(1989) Seamless Copper Water Tube.
ASTM D 1785	(1989) Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
ASTM D 2241	(1989) Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
ASTM D 2287	(1981; R 1988) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
ASTM D 2464	(1989) Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
ASTM D 2466	(1989) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
ASTM D 2564	(1988) Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
ASTM D 2774	(1972; R 1983) Underground Installation of Thermostatic Pressure Piping.

ASTM D 2855 (1983) Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

ASTM D 3261 (1988a) Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

ASTM F 441 (1989) Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A112.26.1M (1984) Water Hammer Arresters.

ASME B1.2 (1983) Gages and Gaging for Unified Inch Screw Threads.

ASME B16.3 (1985) Malleable Iron Threaded Fittings, Classes 150 and 300.

ASME B16.15 (1985) Cast Bronze Threaded Fittings, Classes 125 and 250.

ASME B16.18 (1984) Cast Copper Alloy Solder Joint Pressure Fittings.

ASME B16.22 (1989) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

ASME B40.1 (1985) Gauges - Pressure Indicating Dial Type - Elastic Element.

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1012 (Sep 1978) Backflow Preventers with Intermediate Atmospheric Vent.

ASSE 1013 (Apr 1988) Reduced Pressure Principle Backflow Preventers.

ASSE 1020 (Feb 1989) Pressure Vacuum Breaker, Assembly (Recommended for Outdoor Usage).

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C509 (1987) Resilient-Seated Gate Valves, 3 through 12 NPS, for Water and Sewerage Systems.

AWWA C901 (1988; Errata) Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. Through 3 in., for Water Service.

FEDERAL SPECIFICATIONS (FS)

FS 0-F-506	(Rev C) Flux, Soldering; Paste and Liquid.

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCHR)

FCCHR-01	(Jun 1988; 8th Ed) Manual of Cross-Connection Control.

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-80	(1987) Bronze Gate, Globe, Angle and Check Valves.
MSS SP-85	(1985) Cast Iron Globe and Angle Valves - Flanged and Threaded Ends.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 2	(1988; Rev 1) Industrial Control Devices, Controllers and Assemblies.
NEMA ICS 6	(1988; Rev 1) Enclosures for Industrial Control and Systems.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1993) National Electrical Code.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 - SUBMITTAL PROCEDURES:

SD-01, Data

Design Analysis and Calculations; GA.

As soon as practicable after award of contract and before acquisition of any materials, a layout plan, including calculations, showing proposed sprinkler system and all applicable appurtenances therefor shall be submitted for written approval. Total number and type of heads, number and type of zones, size of piping, valve locations, etc., shall be indicated. Calculations shall include pressure losses to and available pressure for the worst head in each zone, the difference in pressure between first and last heads, and any other calculations necessary to accomplish the requirements of PART 1 paragraph DESIGN CRITERIA.

Spare Parts; FIO.

Design analyses and pressure calculations verifying that system will provide the irrigation requirements. Spare parts data for each different item of material and equipment specified, after approval of the related submittals and not later than the start of the field tests. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

Framed Instructions; GA.

Labels, signs, and templates of operating instructions that are required to be mounted or installed on or near the product for normal, safe operation.

Field Training Data; FIO.

Information describing training to be provided, training aids to be used, samples of training materials to be provided, and schedules and notification of training.

SD-04, Drawings

Irrigation (Sprinkler) System; FIO.

Detail drawings for valves, backflow preventers, automatic controllers, emitter heads, and water hammer arresters. Drawing shall include of a complete list of equipment and materials, and manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation instructions. Drawings shall also contain complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will function as a unit. Drawings shall show proposed system layout, type and number of emitters, zone valves, drain pockets, backflow devices, controllers, and mounting details of controllers. As-built Drawings which provide current factual information showing locations of mains, heads, valves, and controllers including deviations from and amendments to the drawings and changes in the work shall be included.

SD-06, Instructions

Irrigation (Sprinkler) System; FIO.

Detailed procedures defining the Contractor's provisions for accident prevention, health protection, and other safety precautions for the work to be done.

SD-07, Schedules

Material, Equipment, and Fixture Lists; FIO.

As soon as practicable after notice to proceed and before procurement of any products, the Contractor shall submit, along with the design drawings and calculations, a complete list of products to be incorporated in the

work. List shall include catalog numbers, cuts, diagrams, and such other descriptive data as may be required by the authorized Government representative.

Zone Operation Schedule; FIO.

Manuals shall include a schedule of zone operation times and sequence of operations meeting the requirements of PART 1 paragraph PERFORMANCE shall be submitted for approval.

SD-09, Reports

Field Tests; FIO.

Performance test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall indicate the final position of control valves.

SD-13, Certificates

Irrigation (Sprinkler) System; FIO.

The material supplier's or equipment manufacturer's statement that the supplied material or equipment meets specified requirements. Each certificate shall be signed by an official authorized to certify in behalf of material supplier or product manufacturer and shall identify quantity and date or dates of shipment or delivery to which the certificates apply.

SD-19, Operation and Maintenance Manuals

Irrigation (Sprinkler) System; GA.

Six copies of operation and six copies of maintenance manuals for the equipment furnished. One complete set prior to field testing and the remainder upon acceptance. Manuals shall be approved prior to the field training course. Operating manuals shall detail the step-by-step procedures required for system startup, operation, and shutdown. Operating manuals shall include the manufacturer's name, model number, parts list, and brief description of all equipment and their basic operating features. Maintenance manuals shall list routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. Maintenance manuals shall include piping and equipment layout, simplified wiring and control diagrams of the system as installed, and system programming schedule.

1.4 DEFINITIONS

1.4.1 Valve

1.4.1.1 Throttle - valve used to regulate flow to a zone.

1.4.1.2 Zone - valve used to activate/terminate flow to a zone.

1.4.2 Zone - a section of heads controlled by one valve.

1.5 GENERAL

The contract drawings indicate extent of the landscaping requiring irrigation. If any departures from the contract drawings are deemed necessary by the Contractor, details of such departures and reasons therefor shall be submitted in writing as soon as practicable after contract award to the authorized Government representative for written approval.

1.6 DESIGN CRITERIA

1.6.1 General

Observance of the criteria established in this paragraph shall not relieve the installed system of meeting the requirements of PART 1 paragraph: PERFORMANCE.

1.6.1.1 Area Coverage

The limits of landscaping requiring irrigation are indicated on the drawings.

1.6.1.2 Design Pressure

Design pressure shall be based on existing static pressure and existing residual pressure as determined by tests performed by the Contractor.

1.6.1.3 Controllers

System shall be automatic with controller(s) and remote controlled valves.

1.6.1.4 Backflow Preventer

A backflow preventer shall be installed on the main between the tie-in to the potable water supply and the first valve off the main.

1.6.1.5 Gate Valve

A gate valve shall be installed upstream of the backflow preventer.

1.6.1.6 Fixed Pipe Risers

Fixed pipe risers above grade shall be copper tubing.

1.6.1.7 Economical and Operational System

The sprinkler system shall be designed utilizing pipe sizes, valves, heads, and zone operation time schedules, to assure an economical and operational system.

1.6.1.8 Mains

Mains shall be manually drainable.

1.6.1.9 Zones

Zones shall be drained automatically.

1.6.2 Pipe Sizing

1.6.2.1 Pressure losses due to meters, valves, backflow preventer, pipe, pipe fittings, elevational differences, etc., shall be used in sizing lines.

1.6.2.2 Pressure available at each head shall be at least the minimum specified by the manufacturer and shall not exceed the maximum specified.

1.6.3 Zoning

1.6.3.1 Number of zones established shall minimize system operation time within economic reason as to size of pipe and number of operating valves required.

1.6.4 Electrical

1.6.4.1 Rules

The installation shall conform to the requirements of NFPA 70, unless more stringent requirements are indicated herein.

1.6.4.2 Coordination

The contract drawings indicate the extent of landscaping requiring irrigation. The Contractor shall become familiar with all details of the work and verify all dimensions in the field so that the equipment will be properly located and readily accessible. Equipment shall be located to avoid interference with mechanical or structural features. If any conflicts occur necessitating departures from the drawings, details and reasons for departures shall be submitted and approved prior to implementing any change.

1.6.4.3 Workmanship

Materials and equipment shall be installed in accordance with recommendations of the manufacturer.

1.6.4.4 Wiring

Wiring between controllers and valves shall be Type UF cable in accordance with Article 339 of NFPA 70. Wiring shall comply with the manufacturer's recommendations.

1.7 PERFORMANCE

1.7.1 System shall be zoned and timed to provide at least 2 gallons per hour per emitter for 6 hours. System shall be capable of providing the optimum water to each different type of plant whether for establishment or for regular irrigation following establishment. The water delivered to each type of plant shall be the volume recommended by the nursery, which produced the plants.

1.7.2 Any zone or part of a zone which does not meet the requirements of the previous paragraph within the schedule of operating times, in the opinion of the Contracting Officer, shall be redesigned to provide the specified coverage at no additional cost to the Government.

1.8 DELIVERY AND STORAGE

Products delivered to site shall be inspected for damage, unloaded, and stored with the minimum of handling. Products shall be protected from the weather; excessive humidity and temperature variation; direct sunlight (in the case of plastic or rubber materials); and dirt, dust, or other contaminants. Do not store products directly on the ground. Inside of pipes and fittings shall be kept free of dirt and debris.

1.9 HANDLING

Products shall be handled in such a manner as to insure delivery to the trench in sound undamaged condition. Pipe shall be carried to the trench, not dragged. Gasket materials and plastic materials that are not to be installed immediately shall not be stored in the direct sunlight. Valves, controllers, heads, etc., shall be removed from protective cover only upon installation.

1.10 FIELD MEASUREMENTS

The Contractor shall verify all dimensions in the field and shall advise the Contracting Officer of any discrepancy before performing the work.

PART 2 - PRODUCTS

2.1 GENERAL MATERIALS AND EQUIPMENT REQUIREMENTS

2.1.1 Standard Products

Materials and equipment shall be the standard products of a manufacturer who has produced similar systems which have performed well for a minimum period of 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

2.1.2 Nameplates

Each item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

2.1.3 Extra Stock

The following extra stock shall be provided: Ten emitter heads of each size and type, two valve keys for operating manual valves, two wrenches for removing and installing each type of head, and four irrigation controller housing keys.

2.2 PIPING MATERIALS

2.2.1 Copper Tubing and Associated Fittings

2.2.1.1 Tubing

Tubing shall conform to requirements of ASTM B 88, Type K.

2.2.1.2 Fittings

Fittings shall conform to ASME B16.22 and ASME B16.18, solder joint. Solder shall conform to ASTM B 32 95-5 tin-antimony. Flux shall conform to FS 0-F-506, Type I.

2.2.2 Red Brass Pipe and Associated Fittings

2.2.2.1 Pipe

Pipe shall conform to requirements of ASTM B 43, regular.

2.2.2.2 Fittings

Fittings shall be Class 250, cast bronze threaded conforming to the requirements of ASME B16.15.

2.2.3 Galvanized Steel Pipe and Associated Fittings

2.2.3.1 Pipe

Pipe shall conform to requirements of ASTM A 53, Schedule 40.

2.2.3.2 Fittings

Fittings shall be Class 150 conforming to requirements of ASME B16.3.

2.2.4 Polyvinyl Chloride (PVC) Pipe, Fittings and Solvent Cement

2.2.4.1 Pipe

Pipe shall conform to the requirements of ASTM D 1785, PVC 1120 Schedule 40 or 80; or ASTM D 2241, PVC 1120 SDR 21, Class 200.

2.2.4.2 Fittings

Solvent welded socket type fittings shall conform to requirements of ASTM D 2466, Schedule 40. Threaded type fittings shall conform to requirements of ASTM D 2464, Schedule 80.

2.2.4.3 Solvent Cement

Solvent cement shall conform to the requirements of ASTM D 2564.

2.2.5 Polyethylene (PE) Plastic Piping

2.2.5.1 Pipe

Pipe shall conform to AWWA C901, outside diameter base with dimension ratio (DR) of 9.3 to provide 150 psi minimum pressure rating.

2.2.5.2 Fittings

Fittings shall conform to ASTM D 3261, DR of 9.3.

2.2.6 Dielectric Fittings

Fittings shall conform to ASTM F 441, Schedule 80, CPVC threaded pipe nipples, 4-inch minimum length.

2.2.7 Emitter Hose and Distribution Tubing

Emitter hose and distribution tubing shall conform to ASTM D 2287, maximum inside diameter of 1/2-inch, minimum wall thickness of 90 mils, vinyl plastic extruded from non-rigid chloride, integrally algae-resistant, homogeneous throughout, smooth inside and outside, free from foreign materials, cracks, serrations, blisters and other effects. Slip fittings shall be provided.

2.3 EMITTER HEADS

2.3.1 Emitter Heads

Emitter heads shall be self-cleaning, pressure compensating diaphragm with one or six self-piercing barbed outlets; each capable of emitting from 1/4 to 2 gallons per hour flow. Emitter body shall be ultraviolet stabilized, algae, and heat resistant plastic construction.

2.4 VALVES

2.4.1 Gate Valves, Less than 3 Inches

Gate valves shall conform to the requirements of MSS SP-80, Type 1, Class 150, [threaded] [soldered] ends.

2.4.2 Gate Valves, 3 Inches and Larger

Gate valves shall conform to the requirements of AWWA C509 and have encapsulated resilient wedge, parallel seats, non-rising stems, and open by counterclockwise turning. End connections shall be flanged. Interior construction of valves shall be bronze including stem containing a maximum 2 percent aluminum and maximum 16 percent zinc.

2.4.3 Angle Valves, Less Than 2 1/2 Inches

Angle valves shall conform to the requirements of MSS SP-80, Type 3, Class 150 threaded ends.

2.4.4 Angle Valves, 2 1/2 Inches and Larger

Angle valves shall conform to the requirements of MSS SP-85, Type II, Class 250 threaded ends.

2.4.5 Remote Control Valves, Electrical

Remote control valves shall be solenoid actuated globe valves of 3/4- to 3-inch size, suitable for 24 volts, 60 cycle, and designed to provide for shut-off in event of power failure. Valve shall be cast bronze or brass or plastic housing suitable for service at 150 psi operating pressure with external flow control adjustment for shut-off capability, external plug at diaphragm chamber to enable manual operation, filter in control chamber to prevent valve body clogging with debris, durable diaphragm, and accessibility to internal parts without removing valve from system.

2.4.6 Drain Valves

2.4.6.1 Manual Valves

Manual valves shall conform to requirements of MSS SP-80, Type 3, Class 150 threaded ends for sizes less than 2 1/2 Inches and MSS SP-85, Type II, Class 250 threaded or flanged ends for sizes 2 1/2 Inches and larger.

2.4.6.2 Automatic Valves

Automatic valves shall be brass or plastic, spring loaded ball drip type, 150 pounds and threaded ends, designed to close at 6-foot pressure head with positive seal at 3 psi pressure or greater and be open to drain at less than 3 psi pressure.

2.4.7 Pressure Regulating Master Valve

Pressure regulating master valve shall be automatic mechanical self-cleaning, self-purging control system having an adjustable pressure setting operated by a solenoid on alternating current with 0.70 amperes at 18 or 24 volts. Valve shall close slowly and be free of chatter in each diaphragm position, have manual flow stem to adjust closing speed and internal flushing, and one or two inlet tappings capable of being installed as a straight pattern valve. Body shall be cast bronze or brass with removable brass seat serviceable from top without removing valve body from system. Valve shall operate at 150 psi working pressure and pilot range from 10 to 125 psi.

2.4.8 Backflow Preventers

Reduced pressure principle assemblies, double check valve assemblies, atmospheric (nonpressure) type vacuum breakers, and pressure type vacuum breakers shall be tested, approved, and listed in accordance with FCCHR-01. Backflow preventers with intermediate atmospheric vent shall be in accordance with ASSE 1012. Reduced pressure principle backflow preventers shall be in accordance with ASSE 1013.

2.4.8.1 Pressure Type Vacuum Breaker

Vacuum breaker shall conform to the requirements of ASSE 1020 and shall be bronze or brass construction, with one or two check valves, vacuum relief, inlet and discharge shut-offs valves, field test cocks, and vacuum relief opening of greater diameter than unit.

2.4.8.2 Reduced Pressure Type Backflow Preventers

Backflow preventers shall be 150-pound flanged cast iron, bronze or brass mounted gate valve and strainer, 304 stainless steel or bronze, internal parts. Total pressure drop through complete assembly shall be a maximum of 10 psi at rated flow. Piping shall be red brass pipe and fittings or galvanized steel pipe and fittings. Strainers shall be bronze or brass construction with gasket caps. Units shall have 200-mesh stainless steel screen elements.

2.5 ACCESSORIES AND APPURTENANCES

2.5.1 Valve Keys for Manually Operated Valves

Valve keys shall be 1/2-inch diameter by 3 feet long, tee handles and keyed to fit valves.

2.5.2 Valve Boxes and Concrete Pads

2.5.2.1 Valve Boxes

Valve boxes shall be cast iron, plastic lockable, or precast concrete for each gate valve, manual control valve and remote control valve. Box sizes shall be adjustable for valve used. Word "IRRIGATION" shall be cast on

cover. Shaft diameter of box shall be minimum 5-1/4 inches. Cast iron box shall have bituminous coating.

2.5.2.2 Concrete Pads

Concrete pads shall be precast or cast-in-place reinforced concrete construction for reduced pressure type backflow preventers.

2.5.3 Pressure Gauges

Pressure gauges shall conform to requirements of ASME B40.1, single style pressure gauge for water with 4-1/2-inch-dial brass or aluminum case, bronze tube, gauge cock, pressure snubber, and siphon. Scale range shall be suitable for irrigation sprinkler systems.

2.5.4 Service Clamps

Service clamps shall be bronze flat, double strap, with neoprene gasket or "O"-ring seal.

2.5.5 Water Hammer Arresters

Water hammer arrester shall conform to the requirements of ASME A112.26.1M; stainless steel construction with an encased and sealed bellows compression chamber.

2.5.6 Emitter Head Accessories

2.5.6.1 Strainer

Strainer shall be provided at inlet to each drip line. Strainer shall have stainless steel screen having equivalent of 140-mesh filtration capacity and incorporate flush valves within strainer to clean screen without disassembling unit.

2.5.6.2 Pressure Regulator

Pressure regulator shall be provided at each drip system if supply pressure exceeds 50 psi.

2.5.6.3 Riser Adapters

Riser adapters shall be provided with a rigid piping system.

2.5.6.4 Tubing Stakes

Tubing stakes shall be plastic coated steel, or other non-corrosive strong material to secure tubing.

2.5.6.5 Emitter Outlet Check Valve (Bug Cap)

Check valves shall be provided at end of each emitter outlet distribution line. Valves shall permit free flow of water with minimum restriction; prevent back siphoning, entry of insects, and contamination into outlet ports.

2.5.6.6 Access Sleeve

Access sleeve shall be provided at buried emitters placed in covered boxes. Lids of access sleeve shall be secured with removable lugs. Drip hose in both vertical and horizontal axis shall be secured.

2.5.6.7 Closure Caps

Closure caps shall be in accordance with manufacturer's recommendations.

2.6 AUTOMATIC CONTROLLERS, ELECTRICAL

Controller shall conform to the requirements of NEMA ICS 2 with 120 or 220-volt single phase service, operating with indicated stations, and grounded chassis. Enclosure shall conform to NEMA ICS 6 Type 3R, with locking hinged cover, wall-mounted in the mechanical room. Controller shall be programmed for various schedules by setting switches and dials equipped with the following features: A switch for each day of week for one, two or three schedules, allowing each station to be scheduled individually as to days of watering; a minute switch for each station with a positive increment range of 0 to 3 hours, set time within one percent; a switch allowing selected schedules to be repeated after each completion of initial watering schedule and allowing each operation to be scheduled throughout a 24-hour day; a circuit breaker for surge protection; and circuit for a 9-volt rechargeable NiCad battery.

2.7 ELECTRICAL WORK

Wiring and rigid conduit for electrical power shall be in accordance with NFPA 70, and Section 16375 ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND.

2.8 CONCRETE MATERIALS

Concrete shall have a compressive strength of 3000 psi at 28 days as specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE.

2.9 WATER SUPPLY MAIN MATERIALS

Tapping sleeves, service cut off valves, and connections to water supply mains shall be in accordance with Section 02510 WATER DISTRIBUTION SYSTEM.

2.10 INSULATING JOINTS

Insulating joints and dielectric fittings shall be in accordance with Section 02510 WATER DISTRIBUTION SYSTEM.

PART 3 - EXECUTION

3.1 INSTALLATION

Sprinkler system shall be installed after site grading has been completed. Excavation, trenching, and backfilling for sprinkler system shall be in accordance with the applicable provisions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, except as modified herein.

3.1.1 Trenching

Trench around roots shall be hand excavated to pipe grade when roots of 2 inches diameter or greater are encountered. Trench width shall be 4 inches minimum or 1-1/2 times diameter of pipe, whichever is wider. Backfill shall be hand tamped over excavation. When rock is encountered, trench shall be excavated 4 inches deeper and backfilled with silty sand (SM) or well-graded sand (SW) to pipe grade. Trenches shall be kept free of obstructions and debris that would damage pipe. Subsoil shall not be mixed with topsoil. Existing concrete walks, drives and other obstacles shall be bored at a depth conforming to bottom of adjacent trenches. Pipe sleeves for bored pipe shall be two pipe diameters larger than sprinkler pipe.

3.1.2 Piping System

3.1.2.1 Cover

Underground piping shall be installed as to meet the minimum depth of backfill cover specified.

3.1.2.2 Clearances

Minimum horizontal clearances between lines shall be 4 inches for pipe 2 inches and less; 12 inches for 2-1/2 inches and larger. Minimum vertical clearances between lines shall be 1-inch.

3.1.2.3 Minimum Slope

Minimum slope shall be 6 inches per 100 feet in direction of drain valves.

3.1.3 Piping Installation

3.1.3.1 Polyvinyl Chloride (PVC) Pipe

a. Solvent-cemented joints shall conform to the requirements of ASTM D 2855.

b. Threaded joints shall be full cut with a maximum of three threads remaining exposed on pipe and nipples. Threaded joints shall be made tight without recourse to wicks or fillers, other than polytetrafluoroethylene thread tape.

c. Piping shall be joined to conform with requirements of ASTM D 2774 or ASTM D 2855, and pipe manufacturer's instructions. Pipe shall be installed in a serpentine (snaked) manner to allow for expansion and contraction in trench before backfilling. Pipes shall be installed at temperatures over 40 degrees F.

3.1.3.2 Soldered Copper Tubing

Pipe shall be reamed and burrs removed. Contact surfaces of joint shall be cleaned and polished. Flux shall be applied to male and female ends. End of tube shall be inserted into fittings full depth of socket. After soldering, a solder bead shall show continuously around entire joint circumference. Excess acid flux shall be removed from tubings and fittings.

3.1.3.3 Threaded Brass or Galvanized Steel Pipe

Prior to installation, pipe shall be reamed. Threads shall be cut in conformance with ASME B1.2. Pipe joint compound shall be applied to male end only.

3.1.3.4 Insulating Joints

Insulating and dielectric fittings shall be provided where pipes of dissimilar metal are joined and at connections to water supply mains as shown. Installation shall be in accordance with Section 02510 WATER DISTRIBUTION SYSTEM.

3.1.4 Valves

3.1.4.1 Manual Valves

Valves shall be installed in a valve box extending from grade to below valve body, with a minimum of 4 inches cover measured from finish grade to top of valve stem.

3.1.4.2 Automatic Valves

Valve shall be set plumb in a valve box extending from grade to below valve body, with minimum of 4-inch cover measured from grade to top of valve. Install automatic valves beside sprinkler heads with a valve box.

3.1.4.3 Drain Valves

Entire system shall be manually or automatically drainable. Low points of system shall be equipped with drain valve draining into an excavation containing 1 cubic foot gravel. Gravel shall be covered with building paper then backfilled with excavated material and 6 inches of topsoil.

3.1.5 Installation of Drip Irrigation System

3.1.5.1 Emitter Hose

Emitter laterals shall be buried 6 inches deep. Connections shall be solvent welded in accordance with manufacturer's recommendation to standard weight Schedule 40 PVC fittings and bushings. Hose shall be installed in a serpentine manner. When cutting hose, shearing tool such as a pipe cutter, knife, or shears shall be used. Manufacturer's recommended tool and procedures when punching hose for emitters shall be followed.

3.1.5.2 Emitter Heads

Emitters shall be installed in a plastic emitter box. Emitter on a rigid PVC nipple shall be connected to PVC drip lateral with a tee or elbow. Tubing shall be attached to barbed fitting and daylight distribution tubing at root ball secured with stake, with bug cap at end of secured distribution tubing. After installing emitters and before operating system, end of drip lateral shall be opened and flushed clean. The number of emitters on a line shall not exceed manufacturer's recommendations for that hose or distribution tubing size and length.

3.1.5.3 Tubing Stakes

Main irrigation line shall be secured with stakes where line is aboveground. Stakes shall be spaced to ensure that hose does not shift location in presence of foot traffic, operations, gravity on slope installations, or environmental effects. Discharge of the emitter distribution tubing shall be staked to ensure that discharge point of emitter will be maintained at specified position in relation to plant material to be irrigated.

3.1.6 Backflow Preventers

Backflow preventer shall be installed in new connection to existing water distribution system, between connection and control valves. Backflow preventer shall be installed with concrete pads.

3.1.6.1 Pressure Type Vacuum Breaker

Pressure type vacuum breaker shall be installed 12 inches above highest head.

3.1.6.2 Reduced Pressure Type

Reduced pressure type shall be installed as follows: Flush pipe lines prior to installing device and protect device by a strainer located upstream. Device shall not be installed in pits or where any part of device could become submerged in standing water.

3.1.7 Control Wire and Conduit

3.1.7.1 Wires

Low voltage wires may be buried beside pipe in same trench. Rigid conduit shall be provided where wires run under paving. Wires shall be number tagged at key locations along main to facilitate service. One control circuit shall be provided for each zone and a circuit to control sprinkler system.

3.1.7.2 Loops

A 12-inch loop of wire shall be provided at each valve where controls are connected.

3.1.7.3 Expansion and Contraction

Multiple tubes or wires shall be bundled and taped together at 20-foot intervals with 12-inch loop for expansion and contraction.

3.1.7.4 Splices

Electrical splices shall be waterproof.

3.1.8 Automatic Controller

Exact field location of controllers shall be determined before installation. Coordinate the electrical service to these locations. Install in accordance with manufacturer's recommendations and NFPA 70.

3.1.9 Thrust Blocks

Concrete shall be placed so that sides subject to thrust or load are against undisturbed earth, and valves and fittings are serviceable after concrete has set. Thrust blocks shall be as specified in section 02510 WATER DISTRIBUTION SYSTEM.

3.1.10 Backfill

3.1.10.1 Minimum Cover

Depth of cover for pipes shall be 24 inches unless under traffic loads, farm operations, and freezing temperatures in which case cover shall be 36 inches. Low-voltage wires shall have 18 inches of cover. Remainder of trench or pipe cover shall be filled to within 3 inches of top with excavated soil, and compact soil with plate hand-held compactors to same density as undisturbed adjacent soil.

3.1.10.2 Restoration

Top 3 inches shall be filled with topsoil and compacted with same density as surrounding soil. Lawns and plants shall be restored in accordance with

Section 02930 EXTERIOR PLANTINGS. Pavements shall be restored to existing condition or better.

3.1.11 Disinfection

Sprinkler system fed from a potable water system shall be disinfected upstream of backflow preventer in accordance with Section 02510 WATER DISTRIBUTION SYSTEM.

3.1.12 Cleaning of Piping

Prior to the hydrostatic and operation tests, the interior of the pipe shall be flushed with clean water until pipe is free of all foreign materials. Flushing and cleaning out of system pipe, valves, and components shall not be considered completed until witnessed and accepted by Contracting Officer.

3.2 FIELD TESTS

All instruments, equipment, facilities, and labor required to conduct the tests shall be provided by Contractor.

3.2.1 Hydrostatic Pressure Test

Piping shall be tested hydrostatically before backfilling and proved tight at a hydrostatic pressure of 150 psi without pumping for a period of one hour with an allowable pressure drop of 5 psi. If hydrostatic pressure cannot be held for a minimum of 4 hours, Contractor shall make adjustments or replacements and the tests repeated until satisfactory results are achieved and accepted by the Contracting Officer.

3.2.2 Leakage Tests

Leakage tests for service main shall be in accordance with Section 02510 WATER DISTRIBUTION SYSTEM.

3.2.3 Operation Test

At conclusion of pressure test, sprinkler heads or emitter heads, quick coupling assemblies, and hose valves shall be installed and entire system tested for operation under normal operating pressure. Operation test consists of the system operating through at least one complete programmed cycle for all areas to be sprinkled.

3.3 POSTING FRAMED INSTRUCTIONS

Framed instructions containing wiring and control diagrams under glass or in laminated plastic shall be posted where directed. Condensed operating instructions, prepared in typed form, shall be framed as specified above and posted beside the diagrams. The framed instructions shall be posted before acceptance testing of the system. After as-built drawings are approved by Contracting Officer, controller charts and programming schedule shall be prepared. One chart for each controller shall be supplied. Chart shall be a

reduced drawing of actual as-built system that will fit the maximum dimensions inside controller housing. Black line print for chart and a different pastel or transparent color shall indicate each station area of coverage. After chart is completed and approved for final acceptance, chart shall be sealed between two 20-mil pieces of clear plastic.

3.4 FIELD TRAINING

A field training course shall be provided for designated operating and maintenance staff members. Training shall be provided for a total period of 1 hour of normal working time and shall start after the system is functionally complete but prior to final acceptance tests. Field training shall cover all of the items contained in the operating and maintenance manuals.

3.5 CLEANUP

Upon completion of installation of system, all debris and surplus materials resulting from the work shall be removed.

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2.5.1.8 Anchoring

The Contractor shall provide concrete anchors to secure the AST to the concrete foundation. The AST shall be secured so as to be capable of withstanding the horizontal equivalent static force of 0.30 times the operating weight of the equipment, at vertical center of gravity of the equipment without causing permanent deformation, dislocations, separation of components, or other damage, which would render the equipment inoperative for significant periods of time. The anchoring configuration shall match that needed for earthquake restraints and meet manufacturer's requirements.

2.5.2 VAPOR ASSIST SYSTEM

The Vapor Assist System shall be CARB certified for Stage II Vapor Recovery. The Vapor Assist System shall be Healy or approved equal.

2.5.3 DISPENSING SYSTEM

Computer controlled dispensing system shall consist of product dispensing units, management control systems, printers, necessary computers, microprocessors, wiring, cabling, and accessory equipment.

2.5.4 Product Dispensing Units

(4) Product dispensing units shall be Gasboy Model 9753ETW1 or approved equal. (4)
Contractor shall provide and install computer controlled, lighted, double sided, remote type, with single hose outlets suitable for single product delivery flow rate of 15 gpm for both hoses combined or from a single nozzle. Steel frame shall be capable of resisting normal vertical and lateral loads and secured to above ground storage tank with at least two 5/8 inch anchor bolts. Exterior panels shall be either stainless steel or steel with baked enamel finish, or combination of the two. Provide manufacturer's standard microprocessor which has the following functions:

a. Displays: Analog displays, five-digit cash display to $999.99, and four-digit volume display to 999.9 gallons.

(4) b. Totalizer: Four-digit (999.9) electronic totalization with (4)
identification for each product volume in gallons.

c. Filters: Replaceable filter element on each product line with a nominal filtration efficiency of 25 microns with a flow rating equal to the rate of the dispensing unit.

d. Backup: Battery backup with automatic charging circuits to hold data for a minimum of three months without recharging. Sales display shall remain visible for 15 minutes after power failure.

e. Accessories: Equip each assembly with accessories such as built-in air eliminators, line check valves, and emergency shut-off valve. Install centering ring or stabilizer bar to ensure proper shearing action for

power panel to each fuel station dispenser pump/motor. The power circuit for each dispenser pump/motor shall be run through a new Emergency Cutoff Switch. The Emergency Cutoff Switches shall be provided with red mushroom head operators, shall be push-off/pull-on type, NEMA 13 oil tight, clearly labeled, located as indicated, and as required in NEC Art. 514.

Within 6.09 m (20 ft.) of the tank/dispenser assembly, the RGS conduit shall be a Class I, Division 2 installation per NEC Art. 501. More than 6.09 m (20 ft.) away from the tank/dispensers the conduit does not need to be Haz. Area. Below ground it shall be Sch. 40 PVC. Above ground and exterior it shall be RGS with PVC coating and above ground interior it shall be EMT.

3.4 FLUSHING

(4) The interior of the relocated 4000 gallon fuel storage tank shall be made clean before fuel is placed inside. Temporary piping or hose equipped with a strainer having not less than a 40-mesh screen shall be installed between the supply pipe and the tank fill connection on the tank from which the fuel is being pumped. A temporary pump will be provided and installed for flushing. The system shall be flushed with the same type of fuel intended for use in the system until the out flowing fuel is "clean" and "bright": clean means the absence of any sediment or emulsion; bright refers to the fluorescent appearance of fuel that has no cloud or haze. (4)

3.5 TESTING

After components of the system have been properly adjusted, the system shall be tested to demonstrate that the system meets the performance requirements for which it was designed. If any portion of the system and or piece of equipment fails to pass the tests specified in this specification section, the Contractor shall make the necessary repairs or adjustments and the test shall be repeated until satisfactory performance is achieved. All tests shall be witnessed by the Contracting Officer, and the Contractor shall notify the Contracting Officer 2 days before testing. All personnel, calibrated instruments and equipment, as well as the fuel required to properly clean and flush the system and to conduct the tests shall be furnished by the Contractor.

3.5.1 Aboveground Storage Tank Tests

3.5.1.1 Tightness Tests

Aboveground tank shall be tightness tested at operating pressure in accordance with manufacturer's instructions and NFPA 30, 2-8.3 prior to placing the tank in service. During testing, tank shall be provided with a suitable pressure relief device. Prior to application of test pressure, remove or valve off piping components which may be damaged by test and install a calibrated test gauge in the system. Maintain test pressure within five percent of initial pressure for at least 2 hours. The Contractor may abort and restart the tightness test when failure occurs. Materials and equipment shall be subject to inspection at the installation site by the Contracting Officer.

conduct tests that require the tanks to be filled or partially filled with product, the Contractor shall coordinate with the Contracting Officer for the scheduling of product delivery. The tests shall demonstrate the following:

a. The tank unloading system performs as designed.

b. The tank fill assembly performs as designed.

c. The dispensers are operational and perform as designed.

d. Each meter/gauge is operational.

3.5.4 Low Liquid Level Pump Shut off Test

(4) The storage tank shall be tested to verify that at 10% (field adjustable) of the tank capacity that the pump shuts-off.

(4)

3.5.5 Overfill Flow Limiter Test

The Contractor shall monitor the filling of each new storage tank with the appropriate fuel in order to verify that the storage tank fill limiter functions as designed. Tank overfill shall stop immediately once the overfill devices operates. Under no circumstances shall the Contractor overfill any storage tank more than 95% full even if the overfill limiter does not function as designed.

3.5.6 System Leak Test

The fuel system shall be visually inspected during system performance testing for leaks.

3.6 PERFORMANCE TEST REPORTS

Upon completion of testing of the installed system, test reports shall be submitted in booklet form showing all field tests performed to adjust each component and all field tests performed to provide compliance with the specified performance criteria. Each test report shall indicate the final position of controls.

3.7 VISUAL INSPECTIONS

The exterior surface of the tank shall be inspected for obvious visual damage prior to the placement of the tank. Surface damage to a storage tank shall be corrected according to manufacturer's requirements before proceeding with the system installation.

3.8 DEMONSTRATIONS

Contractor shall conduct a training course for the operating staff as designated by the Contracting Officer. The training period shall consist of

SECTION 13205

FLEET MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1999) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 1238	(1996) UL Standard for Safety Control Equipment for Use with Flammable Liquid Dispensing Devices

1.2 SYSTEM DESCRIPTION

This specification establishes the performance and design requirements for an Automated Fuel Management System that will control and record the dispensing of fuel. The vendor shall provide a standalone system, capable of unattended operation for 7 days a week, 24 hours a day. Products shall be limited to users/customers with authorized credit cards or read/write PROKEE®s. Dial up of the island key/card reader(s) shall be by voice grade, analog telephone with user-friendly software loaded on a remotely located PC. The fuel management system (automated data collection system) shall reliably read all credit cards and other access devices. The system shall be FUELMASTER® (Syn-Tech Systems, Inc. {800} 888-9136) or equal.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 - SUBMITTAL PROCEDURES:

SD-01 Data

Components and Equipment Data; GA.

Manufacturer's catalog data shall be included with the detail drawings for the following items. The data shall be highlighted to show model, size, options, etc., that are intended for consideration. Data shall be adequate to demonstrate compliance with contract requirements for the following:

a. Master Island key reader
b. Total number of hoses for master unit
c. Satellite island key reader
d. Total number of hoses for satellite
e. Tank monitor interface
f. On-site printer
g. Computer and printer

SD-04 Drawings

Fleet Management System; GA.

Drawings shall consist of equipment layout including assembly and installation details and electrical connection diagrams. Drawings shall include any information required to demonstrate that the system has been coordinated and will properly function as a unit and shall show equipment relationship to other parts of the work, including clearances required for operation and maintenance.

SD-07 Schedules

Field Training Schedule; GA.

Proposed schedule for field training, at least 2 weeks prior to the start of related training.

SD-19 Operation and Maintenance Manuals

Manuals; FIO.

The manuals shall include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance including the name of a local supplier, simplified wiring and controls diagrams, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment. Each service organization submitted shall be capable of providing 4 hour onsite response to a service call on an emergency basis.

PART 2 - PRODUCTS

2.1 SYSTEM COMPONENTS

The fuel management (automated data collection) system shall as a minimum, consist of:

a. Read/write PROKEE®s which are unique to each vehicle, user, supervisor or tanker truck and activate the system by insertion into a key or card reader. (Hereafter, the term "SMARTCARD" can be used interchangeably with the term key.) Keys or cards should be capable of being written to 100,000 times, and should contain the previous transaction mileage and range for reasonability check. Quantity and product restrictions are also to be on

encoded keys. Keys must have gold plated contacts and pins. Keys cannot require a turning or twisting motion to activate the system.

b. MasterCard Fleet Cards belonging to INS vehicles.

c. A key\card reader device located on the fuel island, capable of turning fuel dispensers on and off, monitoring fuel dispensed, recognizing authorized keys/cards; and with the capability to interface with existing/new dispensers and tank level monitoring systems. With credit cards, the system is capable of dialing up the clearing authority for acceptance prior to refueling of the equipment/vehicle, or depending on the card, ensure that the card has an authorized account number and then storing the transaction data. The island equipment must have a 32-bit processor and a minimum of a 33.6Kbps modem.

d. A central controller (PC) with provision for a printer.

e. A key encoder that is interfaced to the PC. Software installed on an IBM compatible PC, which permits the encoding and re-encoding of keys; manipulation of transaction data for printing reports on vehicles, users, products, etc.; downloading of transactions and uploading of authorized user/vehicle lists and transfer and storage of data. Transaction data may be transferred to any program accepting a flat ASCII file. Software must include an invoicing capability that allows the user to generate invoices for selectable customers or agencies from the central controller printer. Invoices must list each transaction for all vehicles for a user-selected period. The PC will store information from vehicles refueled using credit/debit cards; however, that information will be limited to date/time, amount of fuel, site, and product. Software must be Year 2000 compliant and must be Windows 95/98/2000 or NT Software.

2.2 SYSTEM CONFIGURATION

The system shall be capable of operating as a credit card reader without requiring pre-authorization or settle-up on a credit card network. The FMU2550 will read the Fleet MasterCard and ensure that it belongs to the INS account group. The equipment and software shall be capable of operating in the five different system access configurations listed below (operating as either a one key or two key system with driver providing keypad input). All configurations shall support the option of terminating a transaction (thus not permitting refueling) if a vehicle's odometer reading is out of the range encoded on its key or card. The buyer shall have the option of selecting the initial configuration and the option of changing the configuration at a later date should operational requirements so dictate.

- Vehicle key or card and verifiable driver number
- Vehicle key or card and unverified driver number
- Vehicle and driver key or card
- Either vehicle or driver key or card
- Driver key or card and verifiable vehicle number

PART 3 - EXECUTION

3.1 SYSTEM CAPABILITY

Each island key reader shall have the ability to simultaneously control up to eight (8) hoses and control up to eight (8) satellite units which in turn can simultaneously control up to eight (8) hoses. Each master and each satellite key reader shall store a minimum of 4,000 transactions. The system shall be capable of performing as a gate opener using switch closure. The fuel management system shall also be capable of controlling bulk or canned oil, antifreeze, CNG and other alternative fuels or liquid products. The system must have the capability to mount a key reader on a tanker truck to act as a mobile refueling site.

Each dispenser will have a timeout to deactivate the dispenser if selected but not activated. Timeouts shall be variable from 1 to 255 seconds.

Each hose controller shall have a missing pulse detector to shut off the dispenser if pulses indicating fuel flow are not received at programmed intervals. This shall be variable from 1 to 255 seconds.

Each hose shall be individually set table for any number of pulses between 1 and 1000 for each unit of measurement.

3.2 OPERATOR INPUT AT FUELING STATION

The system shall include a key or card reader with a liquid crystal display (LCD) using light emitting diodes (LED) with backlight, that is a minimum of 2 lines by 40 characters. It must also include a numeric key pad (0 through 9, A through D, Enter/Yes, and Clear/No) located near the pumps. The operator shall be prompted by the LCD to input information (which shall be recorded as part of the transaction record) for each transaction in accordance with paragraph SYSTEM CONFIGURATION.

3.3 DATA MANAGEMENT AND REPORTING

Each island key or card reader may be downloaded by the central controller operator at his/her convenience or at a time of day programmable by the central controller operator. When automatically downloading, the system shall dial each site in sequence and generate a report of all transactions for individual sites once each 24-hour period. The system must be capable of unattended dialing and downloading, thus permitting downloading when sites are not in use and when phone rates are less. The software shall operate on an IBM compatible PC using Windows Software, with 32Mb of RAM and 100Mb of hard disk space, operating at 266MHz or faster, and with a 33.6Kbps modem or faster.

3.3.1 Report Generation

The system shall provide the following information at the central controller as a transaction record:

- User identification number.
- Vehicle odometer or hour reading.
- Vehicle Number.
- Number of units (gallons, quarts, cubic feet, therms, etc.) dispensed to tenths, hundredths, etc.
- Fuel site.
- Data & time.
- Hose number.
- Product number.
- Key type

3.3.2 Credit Card Transactions

Credit card transaction information will return to the central controller the vehicle number which can be used to identify the vehicle and organization to which it belongs.

3.3.3 Totalization of Data

The system shall be capable of totaling monthly fuel costs by organization number, vehicle ID number, agency number, and user number for vehicles using the Prokee. The system shall keep a declining balance inventory of fuel remaining in storage. The inventory report shall give a summary of the remaining fuel in each storage tank monitored. It must also note when fuel should be purchased for a specific tank.

3.3.4 Inventory Records

The system shall allow the operator to compile summary reports for all transactions by site, organization, date, vehicle, for vehicles using on the Prokee network. Card transactions will be recorded by amount, site, product, and time/date.

3.3.5 Summary Reports

All vehicles due for preventive maintenance shall be printed as an exception report on the central controller's printer, provided the PM option is used for vehicles on the proprietary key or Smart Card system.

3.3.6 Preventative Maintenance

All vehicles which have an out of range odometer reading shall be printed as an exception report on the central controller's printer.

3.3.7 Record Display

The central controller shall be capable of displaying reports on the central controller monitor before the reports are printed. When reports are displayed on the monitor, the user shall be capable of scrolling up and down to view any page of the report.

3.4 STORAGE CAPACITY

In the event of a power failure to the island key reader equipment located at the pump, the system shall have the capability to store all data collected up to the time of the power failure for a minimum period of three months. The equipment at each fueling site must have the ability to operate if the central processor is down, limited only by the key reader's internal storage capacity. There shall be a method to access dispenser transaction information should there be data transmission problems. The mainboard, with memory, shall be removable and must be capable of being installed in an operating unit and downloaded; or, if the central controller is inoperable, another central controller shall be capable of downloading data. Support for this shall also be provided by the factory when required.

3.5 REQUIRED FEATURES

These required features must be available, without exception:

3.5.1 Upgradable to Fully Automated RF/TAG System

The fuel management system must be capable of being upgraded to a fully automated system, requiring no human intervention for the system to operate. RF/TAG technology is the preferred method for an autonomous system.

3.5.2 On-site transaction Printer

On-site transaction printer. There shall be an option of providing an on-site transaction printer. With this option, an on-line (driven by the key\card reader) printer, located at the self-service fueling station, will print (record) each transaction as it occurs, thus allowing the remote site operators to maintain a hard copy record of transactions, as well as the capability to print the site configuration and total fuel dispensed by hose number and product code. This capability to provide an on-site printer is mandatory.

3.5.3 True Manual Override

The system shall permit manual override of the fuel management system should any problem occur. The override must be a complete, total by-pass of the fuel management system.

3.5.4 Semi-Manual Mode

The system shall have the capability to record fuel dispensed in emergency situations when there is a need for vehicles without keys/cards to be refueled or to streamline refueling operations, and yet accountability is still desired. With this option, individual key\card readers may be put into the semi-manual mode with a Supervisor's key. When in this mode, fuel can be dispensed by any pump as if the key reader were not functioning, but the key\card reader will record all transactions as semi-manual transactions dispensed under the supervisor's key number.

3.5.5 Self diagnostic capability

The island key reader shall permit diagnostic testing of boards, LCD, and keypad using the supervisor's key.

3.5.6 No-twist Key

The key used to activate the system cannot require a turning or twisting motion. Information must be read from the key by merely inserting the key straight into a key receptacle.

3.5.7 Toll Free Support

The vendor shall provide toll free support during the warranty or extended maintenance period for the hardware and software which is being bid. Additionally, a means of dialing the vendor's product support technicians directly from the island key reader is desired.

3.5.8 Extended Maintenance Agreements

The vendor shall offer extended maintenance agreements on an annual basis for the life of the system (minimum 10 years).

3.5.9 Customer School

The vendor shall provide a customer school for the training of system operators. There should be no charge for the school other than transportation, hotel and per diem.

3.5.10 Surge Protection

The system shall have surge (lightning) protection on the AC power line and on the telephone line. The standard system shall have surge protection, with additional surge protection available for lightning prone areas. Surge protection shall be designed specifically for the voltage and current requirements of the fuel management system.

3.5.11 Modifiable Prompts.

The system shall have the capability to customize the initial entry prompt, user ID and vehicle ID prompts.

3.5.12 Remote Personal Computer Jack

The system shall have the appropriate interfaces available to permit the operator to connect a lap top computer directly to the island key reader to provide download transactions and upload vehicle and personnel lists, as well as providing local diagnostic capabilities.

3.6 DESIGN

The equipment shall be designed to operate for a minimum of a 10-year life. Repair parts for the unit shall be available for this period. Equipment should be designed in a modular manner to permit replacement of components by non-technical personnel.

3.6.1 Operability

The equipment shall be simple to operate and supplied with operating instructions. The computer and data collection/download interface shall require a minimum of operating instructions and require little or no prior computer operating experience.

3.6.2 Maintainability

Suitable clearance and access shall be provided to all maintainable points. The system shall be of modular construction and have circuit boards/components that are replaceable by the user. If available, the bidder should provide documentation from an outside source indicating the time required for replacing components. It is expected that replacement of circuit boards/wiring harnesses should take less than ten minutes. If the island key reader is accessed by a modem, the unit shall have the capability of the user plugging in a telephone and talking directly to factory technicians who can assist in diagnostics and repair while working on the key reader.

The system must have the capability to allow the manufacturer's technicians to dial into the customer's system software (using PC Anywhere or an equal program) to assist with software and database management, as well as providing training. This shall be via voice grade, analog telephone lines.

3.6.3 Environment

The vehicle operator interface with the equipment will be outdoors and exposed to the elements. Thus, the fuel island unit must have an operating range of -60 degrees F to +140 degrees F and withstand rain, snow, and blowing sand. The system shall have been tested by an independent environmental testing organization to provide outside affirmation of environmental limits.

3.6.4 Electrical Services

This equipment shall be designed to operate from 120 volt AC, 60 Hz single phase power.

3.6.5 Safety

The equipment shall be provided with all necessary safety devices and guards to protect the operator. All primary operator control buttons, switches, etc. shall be grouped and mounted in a location affording the operator convenient access to the controls. Essential safety operating instructions

shall identify safety and health hazards associated with the equipment and the procedures and practices necessary for safe operations. Placards shall be provided to warn operator or maintenance personnel of hazardous areas which could cause injury. Installation manuals and maintenance manuals shall include all necessary safety and hazardous conditions warnings.

3.6.6 Training

The supplier shall provide on-site training of personnel in the functions of operation, maintenance, and repair as they apply to each specific item of equipment. Supervisors and operators at each refueling site will be provided training in the operation of the island fuel management units. Training on software may be conducted on-site or via a remotely located computer on line with the central controller (PC) operator.

3.7 MAINTENANCE AND SPARE PARTS

3.7.1 Spare Parts

The manufacturer shall agree to sell spare parts for the operating life of the equipment, estimated to be 10 years. The vendor shall provide any documentation that supports the assertion that spare parts will be available for 10 years.

3.7.2 Maintenance Agreement

The manufacturer shall agree to provide system maintenance on a yearly renewable contract for the life of the system. The manufacturer, under a maintenance agreement, would be responsible for providing all repair parts. Labor for repairs will be provided by the manufacturer if the modular parts cannot quickly be changed using simple hand tools (screw driver, pliers, wrenches, etc.). The procuring agency may or may not accept the terms of the maintenance agreement and may or may not renew the maintenance contract on an annual basis.

3.8 WARRANTY

The Manufacturer shall warrant parts and labor of all equipment supplied for a period of one (1) year. Read/write keys shall be warranted for five (5) years. All replacement parts shall be provided by the Manufacturer for this one (1) year period, except those required by acts of nature (i.e., flood, lightning, etc.).

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(1,500 square feet) of floor area. The design area requirement for the dry pipe system, and the pre-action system, is 30% larger than that for the wet pipe system design without reducing the density requirement (per NFPA 13). The minimum pipe size for branch lines in gridded systems shall be 32 mm (1-1/4 inch). Hydraulic calculations shall be in accordance with the Area/Density Method of NFPA 13.

1.2.1.1 Hose Demand

An allowance for exterior hose streams as indicated shall be added to the sprinkler system demand at the fire hydrant shown on the drawings closest to the point where the water service enters the building.

1.2.1.2 Basis for Calculations

(4) The design of the system shall be based upon the newly installed water supply line for the City of Alpine. Static and residual water pressure data shall be obtained from this line. A 10% safety factor shall be included in the calculations. Hydraulic calculations shall be based upon the Hazen-Williams formula with a "C" value of 120 for steel piping (including galvanized), 150 for copper tubing, 140 for new cement-lined ductile-iron piping, and 140 for new PVC piping. (4)

1.2.2 Sprinkler Spacing

Sprinklers shall be uniformly spaced on branch lines. Maximum spacing per sprinkler shall not exceed limits specified in NFPA 13 for light, ordinary, or extra hazard occupancy, as required.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. Submittals related to system configuration, hydraulic calculations, and equipment selection, including manufacturer's catalog data, working drawings, connection drawings, control diagrams and certificates shall be submitted concurrently as a complete package. The package will be reviewed by the U.S. Army Corps of Engineers, Los Angeles District. The following shall be submitted in accordance with Section 01330 - SUBMITTAL PROCEDURES:

SD-01 Data

Load Calculations for Sizing Sway Bracing; GA.

Details for bracing and corresponding load calculations shall be provided for sizing of sway bracing for protection against damage from earthquakes.

Sprinkler System Equipment; GA.

Manufacturer's Catalog Data for each separate piece of equipment proposed for use in the system. Data shall indicate the name of the manufacturer of each item of equipment, with data highlighted to indicate model, size, options, etc. proposed for installation. In addition, a complete equipment list which includes equipment description, model number and quantity shall be provided.

2.3.4.4 Air Release Valve

Automatic air release valve shall have minimum 15 mm inlet size with a minimum orifice size of 3.5 mm (3/32 inch). Valve shall be listed in UL-04 and/or FM P7825.

(4) 2.3.4.5 Deleted

(4)

2.4 RISER CHECK VALVE ASSEMBLY

Riser check valve assembly shall consist of a rubber-faced check valve which is UL listed and/or FM Approved for fire sprinkler service. Tapped openings shall be provided to connect a drain valve, and inlet and outlet pressure gauges. Assembly shall be provided complete with pressure gauges and main drain.

2.5 AUTOMATIC WATER CONTROL VALVE (PRE-ACTION SYSTEM VALVE)

Automatic water control valve (deluge valve) shall be electrically and pneumatically actuated (double interlocked) and rated for a working pressure of 1207 kPa (175 psi). Electrical solenoid valve used to actuate the water control valve shall be an integral component of the valve or shall be approved for use by the water control valve manufacturer. Solenoid valve shall also be approved for use (per specific UL listing or FM approval) by the fire alarm control system manufacturer; it shall be rated at 24 volts direct current and shall be normally closed type which operates when energized. Solenoid valves shall be rated for a maximum pressure differential of 1207 kPa (175 psi). Assembly shall be complete with all necessary trim for a double interlocked, electric/pneumatic system configuration. Trim shall include, but not be limited to: alarm and alarm test valves, and pressure gauges (water supply, diaphragm chamber, system air pressure).

2.6 DRY PIPE VALVE ASSEMBLY

The dry pipe valve shall be a latching differential type listed in UL Fire Prot Dir or FM P7825a and FM P7825b and shall be complete with trim piping, valves, fittings, pressure gauges, priming water fill cup, velocity drip check, drip cup, and other ancillary components as required for proper operation. The assembly shall include a quick-opening device by the same manufacturer as the dry pipe valve for systems over 1890 liters (500 gallons) in capacity.

2.7 AIR SUPPLY SYSTEM

Air supply system shall be in accordance with NFPA 13. The connection pipe from the air compressor shall not be less than 15 mm (1/2 inch) in diameter and shall enter the system above the priming water level of the dry pipe